

ADVANCED PRECAST CONCRETE SYSTEM (APCS)

Information Kit
Version 1 – 2026



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1. INTRODUCTION

This information kit aims to share key information on the Advanced Precast Concrete System (APCS) and to equip stakeholders with the necessary knowledge for APCS construction.

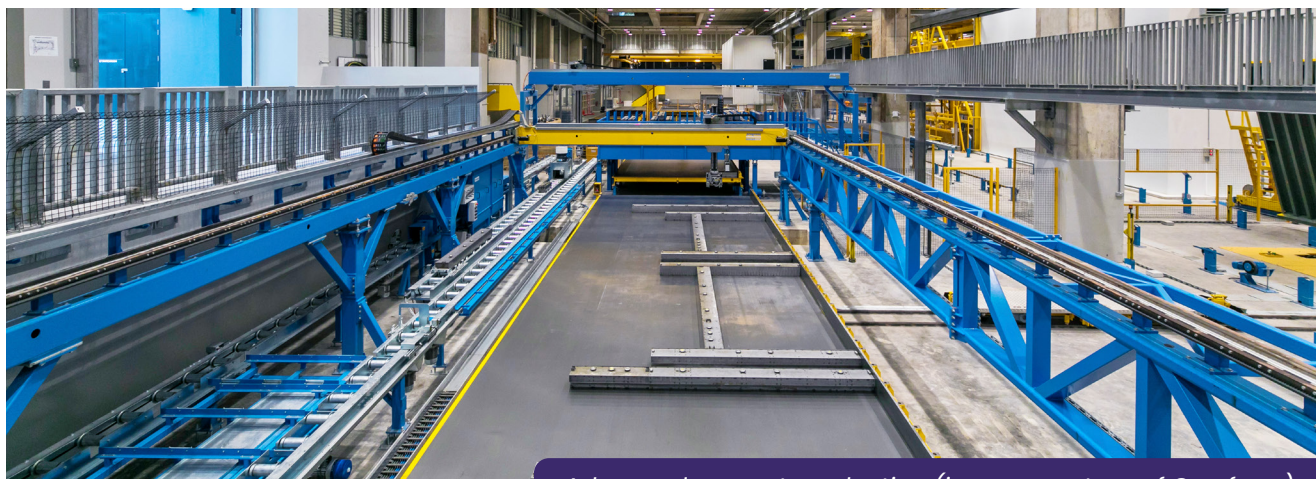
Different sections of this kit are more relevant to specific stakeholders. Each section is labelled with the target audience in mind. The table below summarises the contents and respective target audience.

Content	 Developer	 Consultant	 Builder	 Precaster
2. Benefits of APCS	✓	✓	✓	✓
3. Regulatory Requirements		✓	✓	✓
4. Key Parts of APCS Construction Method		✓	✓	✓
5. APCS Requirements		✓	✓	✓
6. Useful Resources	✓	✓	✓	✓
7. APCS Computation Examples		✓	✓	✓
Annex – Examples of Buildable Connections		✓	✓	✓

2. BENEFITS OF APCS

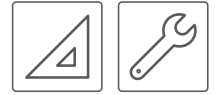


Adopting APCS has significant benefits, including improved productivity and quality control in the off-site manufacturing and on-site assembly of the precast concrete components. The reduced on-site concreting work and faster installation of precast components could lead to shorter floor cycles and productivity improvement of up to 20% in terms of manpower and time savings. These improvements would also help create cleaner and safer working environments and cause less disamenities to surrounding sites.



Advanced precast production (image courtesy of Greyform)

3. REGULATORY REQUIREMENTS



When carrying out the structural design and construction of precast concrete joints and connections, the consultant or builder must comply with the objectives and performance requirements set out in the Fifth Schedule of the [Building Control Regulations 2003](#). The prescribed objectives and performance requirements are deemed to be satisfied if the design and construction of a building complies with the acceptable solutions set out in the [Approved Document issued by the Commissioner of Building Control](#).

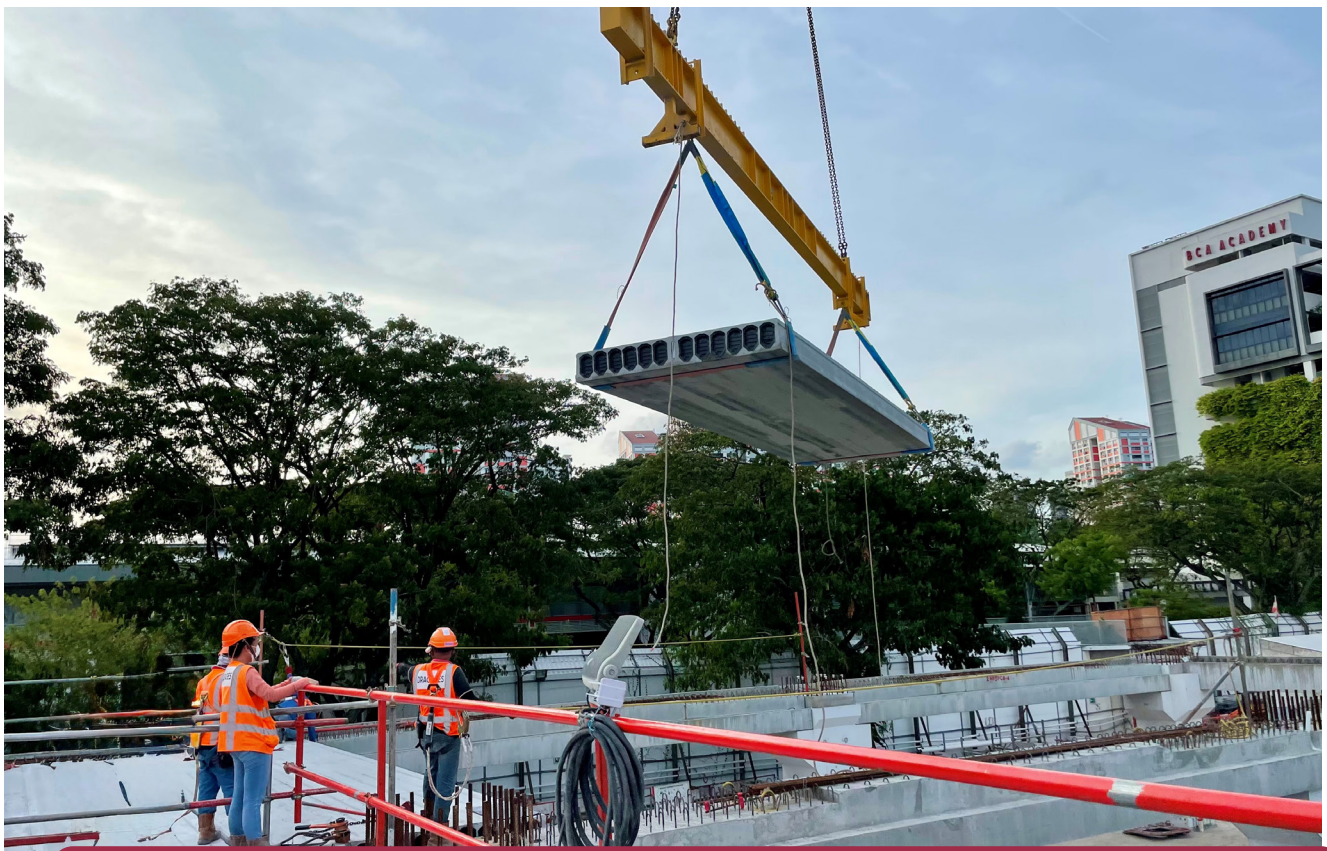
Connection details, including mechanical connectors, must:

- Be compatible with the design assumptions for the precast concrete structure; and
- Use materials that are robust and compatible with the durability requirements of the overall structure.

The designer and builder are to refer to the standards prescribed in the Approved Document for the structural design and construction of precast concrete joints and connections.

The primary design responsibility in adopting any proprietary mechanical connectors lies with the Qualified Person (QP). The QP is responsible for assessing compliance with relevant codes and regulatory requirements, as well as the connector product quality and reliable performance.

Where mechanical connectors are used, including any new connection systems, the test requirements are to be in accordance with the relevant EN product standard or European Technical Assessment. This can be done through examining technical specifications, test certificates from accredited laboratories, and/or conducting appropriate local verification tests. For products that do not have the CE (Conformité Européenne) marking, recognised third-party auditors are to be appointed by the end user (that is the developer, Qualified Person, or Main Contractor, but not the supplier) to audit the production processes and tests.



Advanced precast construction with use of large precast slab panels to optimise lifting and installation

4. KEY PARTS OF APCS CONSTRUCTION METHOD



To achieve productivity and quality improvements offsite and onsite, the development of APCS components and buildings must consider the manufacturing and assembly aspects right from the design stage. Some key aspects that designers and builders should consider include:

- a. **Reducing the number of precast components** to reduce the number of component handlings, installation lifts, and on-site jointing works. These would lead to faster installation times, improved quality, and freed-up tower crane time for other uses. This can be achieved through larger, integrated and/or volumetric components. Some examples include prefabricated bathroom units (PBUs), volumetric household shelters, multi-tier columns/walls, double bay facades, and large panel slabs.

Where integrated components comprising two or more elements, or large precast panel slabs are used, the sizing of the components should consider how they will be transported from the fabrication yard to construction site. If the load is oversized, it must meet the Land Transport Authority (LTA)'s traffic regulations for transporting large or heavy items.

Auxiliary police escort is required if:

Height	> 4.5 metres (inclusive of truck height)
Width	≥ 3.4 metres
Laden Weight	> 80 tonnes

Please refer to the LTA PROMPT [website](#) for the latest requirements on Oversized Vehicle Movement.

- b. **Reducing on-site wet joints** to improve on-site installation, and off-site manufacturing efficiency and quality, as well as worksite cleanliness and safety. This could be achieved by having less protruding rebars, temporary forms, and on-site concreting works. Methods of achieving this include: using mechanical connections, integrated prefabricated columns, and beam junctions. For reference, some examples of these buildable connection methods are provided in the Annex.

- c. **Reducing on-site finishes** to improve quality of workmanship, on-site and off-site productivity, as well as worksite cleanliness and safety by cutting down on work at heights. Methods of achieving this include: pre-finishing offsite, using pigmented/exposed concrete finishes and form-liners, and/or producing high quality off-form finish to eliminate skim coating and plastering works.
- d. **Reducing temporary props** for on-site installation works to improve speed of installation and worksite safety. Methods of achieving this include: self-spanning precast beams/slabs in the temporary condition, self-supporting columns and walls using mechanical connections, and self-stabilising volumetric components.
- e. **Adopting modularised/standardised components** to simplify design, improve off-site manufacturing efficiency, and speed up on-site assembly. This approach also reduces the number of moulds that need to be fabricated and enables their increased use or re-use across projects. Methods of achieving this include: adopting industry standard sizes, using three common sizes that cover the 65% of the component type, etc.
- f. **Using advanced manufacturing methods** to increase fabrication efficiency, quality, and safety, as well as reduce manpower and/or laborious manual work. Methods of achieving this include: fabricating precast components using pallet circulation system, extrusion or slip-forming machines, advanced or battery moulds, and off-site 3D printing. Other approaches include applying finishes off-site using robots and using automated production for rebar cages.

5. USEFUL RESOURCES



APCS Guidebook

go.gov.sg/apcs-guidebook



BCA contact

Construction Productivity and Quality

BCA_DfMA_enquiry@bca.gov.sg

Integrated Construction Prefabrication Hub (ICPH) companies:

S/N	ICPH Company	Website
1	Greyform Pte Ltd	www.greyform.sg
2	HL-Sunway Prefab Hub	www.hlasia.com.sg www.sunwayconstruction.com.my
3	Integrated Precast Solutions Pte Ltd	www.ipspl.com.sg
4	Precast Concrete Pte Ltd	www.precastconcrete.com.sg
5	Prefab Technology Pte Ltd	www.prefabtech.com.sg
6	Robin Village Development Pte Ltd	www.robinvillage.com.sg

Some possible mechanical connector solution providers*:

S/N	Mechanical Connector Company	Website
1	J&P Building Systems Pte Ltd	https://building-systems-sg.pfeifer.info/en/home/
2	JLFC Pte Ltd	www.j-group.com.sg
3	Leviat Pte Ltd	www.leviat.com/en-sg
4	Peikko Singapore Pte Ltd	www.peikko.sg
5	Precast India Connections Pvt Ltd	www.piconnections.co.in
6	Splice Sleeve (S) Pte Ltd	www.splicesleeve.sg
7	TECHNOS CO., LTD (Singapore Branch)	www.technos.info/eng/business/temporary_asia.html

*The mechanical connector solution providers have been listed in alphabetical order. The list is not exhaustive and not an implicit endorsement of any of the solution providers or their products. **The QP is responsible for assessing compliance with relevant codes and regulatory requirements, as well as connector product quality and reliable performance.** Where mechanical connectors are used, including any new connection systems, the test requirements are to be in accordance with or equivalent to the relevant EN product standard or European Technical Approval. This can be done through the examination of technical specifications, test certificates from accredited laboratories, and/or by conducting appropriate local verification tests. For products that do not have CE marking, recognised third-party auditors are to be appointed by the end user (that is either, the developer, QP, or Main Contractor, but not the supplier) to audit the production processes and tests. For further details on the mechanical connectors, please contact the solution providers.

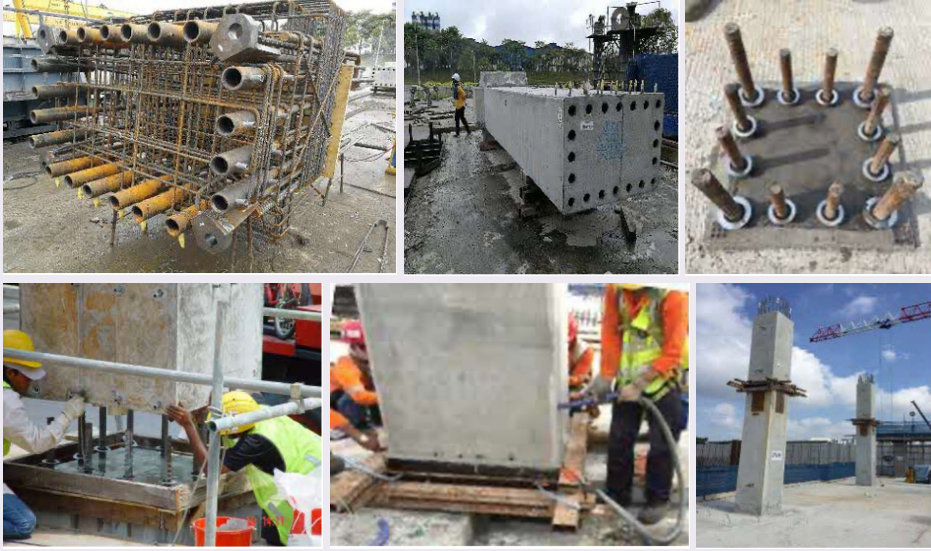
ANNEX – EXAMPLES OF BUILDABLE CONNECTIONS



The table below provides examples of buildable connections using mechanical connectors / integrated connection systems. The examples provided are not exhaustive. Some possible solution providers have also been listed in the table, in alphabetical order, and images shown are courtesy of the solution providers. Details provided are strictly for illustration purposes only and are not implicit endorsements of any of the products or the solution providers. The QP is responsible for assessing compliance with relevant codes and regulatory requirements, as well as connector product quality and reliable performance. Where mechanical connectors are used, including any new connection

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A. Mechanical connection for precast column / precast wall (horizontal joints)

Buildable Connection Systems / Mechanical Connectors, and Possible Solution Providers*	Examples of Product Application
A1. Couplers / Splice Sleeves  Possible solution provider(s): 1. JLFC Pte Ltd 2. Leviat Pte Ltd 3. Splice Sleeve (S) Pte Ltd	Columns  Walls 

**Buildable Connection Systems
/ Mechanical Connectors, and
Possible Solution Providers***

Examples of Product Application

A2. Column shoes



Possible solution provider(s):

1. J&P Building Systems Pte Ltd
2. JLFC Pte Ltd
3. Leviat Pte Ltd
4. Peikko Singapore Pte Ltd



A3. Wall shoes



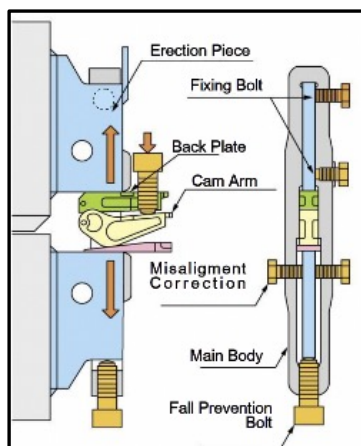
Possible solution provider(s):

1. J&P Building Systems Pte Ltd
2. JLFC Pte Ltd
3. Peikko Singapore Pte Ltd



Buildable Connection Systems / Mechanical Connectors, and Possible Solution Providers*

A4. Temporary mechanical connectors for reduced-prop erection and alignments (used in combination with permanent mechanical connectors, such as splice sleeves)



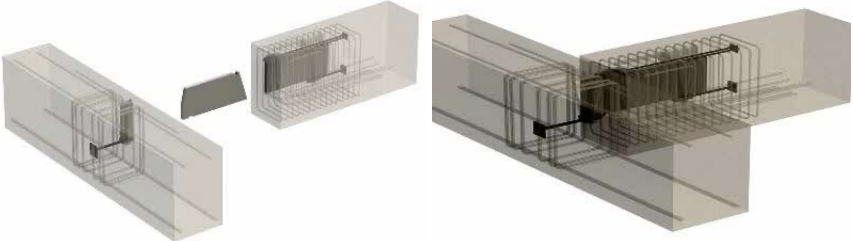
Possible solution provider(s):

1. TECHNOS CO., LTD
(Singapore Branch)

Examples of Product Application



B. Mechanical connection for precast beam / Integrated prefabricated column and beam junction

Buildable Connection Systems / Mechanical Connectors, and Possible Solution Providers*	Examples of Product Application
B1. Couplers / Splice Sleeves  Possible solution provider(s): 1. JLFC Pte Ltd 2. Leviat Pte Ltd 3. Splice Sleeve (S) Pte Ltd	
B2. Telescopic beam connectors  Possible solution provider(s): 1. Leviat Pte Ltd	Beam to beam  Beam to column 

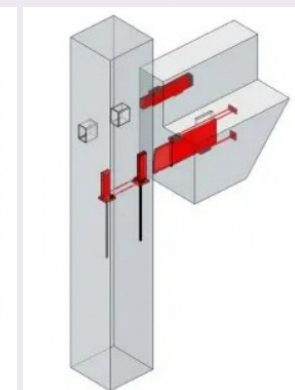
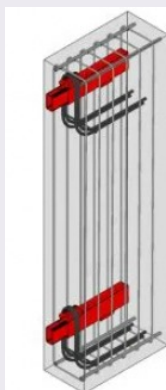
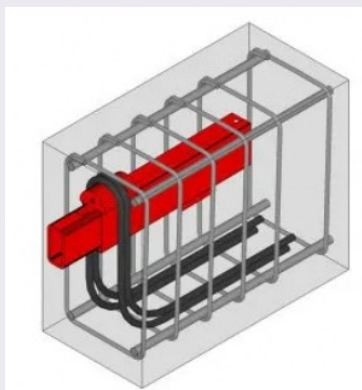
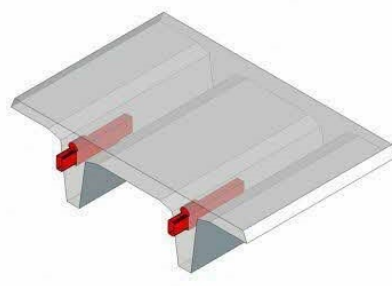
**Buildable Connection Systems
/ Mechanical Connectors, and
Possible Solution Providers***

Examples of Product Application

**B3. Telescopic beam /
slab connectors**



Possible solution provider(s):
1. Leviat Pte Ltd



B4. Steel bolted-on corbel



Possible solution provider(s):
1. Peikko Singapore Pte Ltd

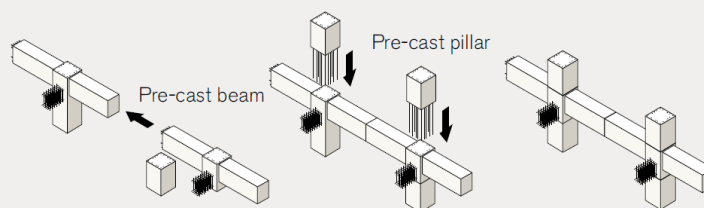


**Buildable Connection Systems
/ Mechanical Connectors, and
Possible Solution Providers***

Examples of Product Application

**B5. Left-Right-Vertical
(LRV) integrated
connection system**

Note: Developed by Obayashi Corporation, Japan. Images courtesy of Obayashi Corporation.



1) Pre-cast beam is horizontally inserted and joined

2) Pre-cast pillar is vertically inserted and joined

3) Assembly completed

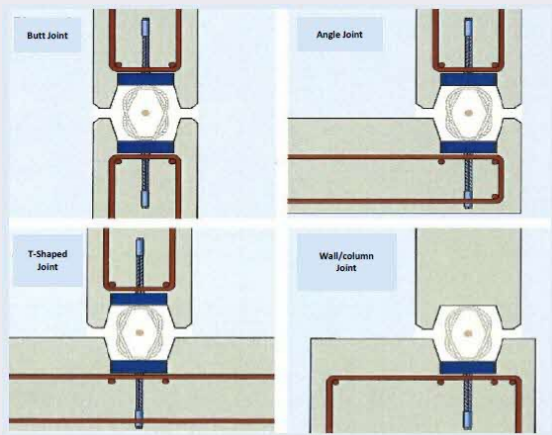


**B6. Lotus Root integrated
connection system**

Note: Developed by Kajima Corporation, Japan. Images courtesy of Kajima Overseas Asia Pte Ltd.



C. Mechanical connection for precast wall (vertical joints)

Buildable Connection Systems / Mechanical Connectors, and Possible Solution Providers*	Examples of Product Application
C1. Flexible loops  Possible solution provider(s): 1. J&P Building Systems Pte Ltd 2. JLFC Pte Ltd 3. Leviat Pte Ltd	 
C2. Panel Connectors  Possible solution provider(s): 1. Leviat Pte Ltd	

Buildable Connection Systems / Mechanical Connectors, and Possible Solution Providers*

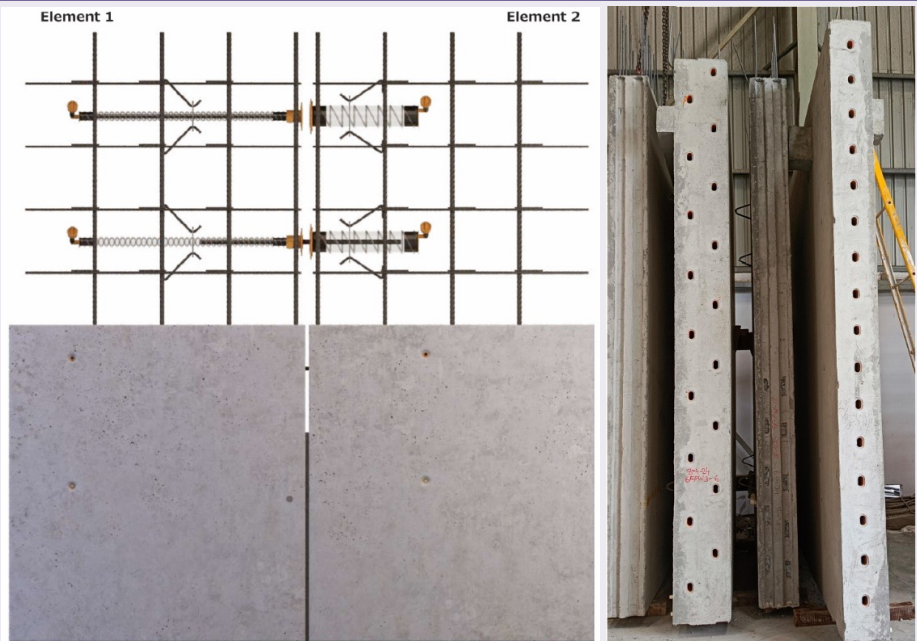
C3. Grouted Sleeve Connections



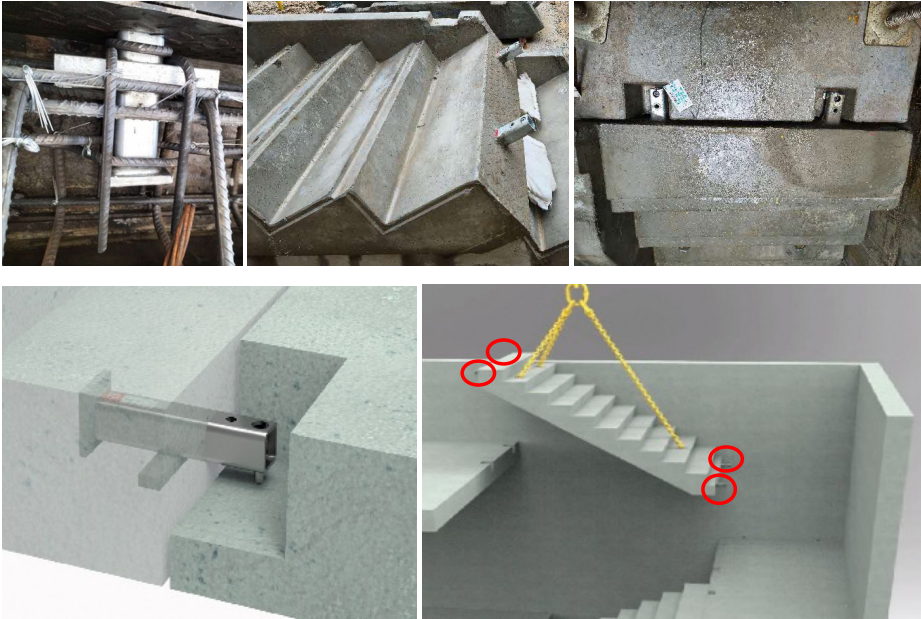
Possible solution provider(s):

1. Precast India Connections Pvt Ltd

Examples of Product Application



D. Mechanical connection for staircases

Buildable Connection Systems / Mechanical Connectors, and Possible Solution Providers*	Examples of Product Application
D1. Staircase landing connectors  Possible solution provider(s): 1. Leviat Pte Ltd 2. Peikko Singapore Pte Ltd	
D2. Staircase flight connectors  Possible solution provider(s): 1. Leviat Pte Ltd	

E. Mechanical connection other precast components

Buildable Connection Systems / Mechanical Connectors, and Possible Solution Providers*	Examples of Product Application
E1. Parapets / planters / balconies using mechanical connectors / anchors Possible solution provider(s): 1. J&P Building Systems Pte Ltd 2. JLFC Pte Ltd 3. Leviat Pte Ltd 4. Peikko Singapore Pte Ltd 5. Splice Sleeve (S) Pte Ltd	Parapets:  Balconies: 